

**WHAT IS CLAIMED IS:**

1. A method for treating or preventing a neurodegenerative disease in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the nervous system of the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said neurodegenerative disease.

2. A method for treating or preventing a neurodegenerative disease in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the brain of the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said neurodegenerative disease.

3. A method for treating or preventing symptoms of a neurodegenerative disease in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the nervous system of the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said neurodegenerative disease.

4. A method for treating or preventing symptoms of a neurodegenerative disease in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the brain of the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said neurodegenerative disease.

5. A method for treating or preventing Parkinson's disease in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the nervous system of the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said Parkinson's disease.

6. A method for treating or preventing Parkinson's disease in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the brain of

the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said Parkinson's disease.

7. A method for treating or preventing symptoms of Parkinson's disease in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the nervous system of the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said symptoms of Parkinson's disease.

8. A method for treating or preventing symptoms of Parkinson's disease in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the brain of the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said symptoms of Parkinson's disease.

9. A method for treating or preventing nigrostriatal degeneration and/or inducing nigrostriatal regeneration in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the brain of the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said nigrostriatal degeneration and/or inducing nigrostriatal regeneration.

10. A method for treating or preventing nigrostriatal degeneration and/or inducing nigrostriatal regeneration in a mammal in need of such treatment comprising administering a lentiviral vector to a target cell in the nervous system of the mammal, said lentiviral vector comprising a nucleic acid sequence comprising a sequence encoding a growth factor operably linked to a promoter, wherein the growth factor is expressed in the target cell thereby treating or preventing said nigrostriatal degeneration and/or inducing nigrostriatal regeneration.

11. The method of any one of claims 1-10 wherein the lentiviral vector is an EIAV.

12. The method of any one of claims 1-10 wherein the lentiviral vector is an HIV.

13. The method of any one of claims 1-10 wherein the lentiviral vector is an SIV.

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14. The method of any one of claims 1-10 wherein the lentiviral vector is an FIV.
16. The method of any one of claims 1-10 wherein the lentiviral vector is a non-primate lentiviral vector.
17. The method of any one of claims 1-10 wherein the nucleic acid sequence  
5 encodes a GDNF.
18. The method of claim 17 wherein the GDNF is a human GDNF or a variant, homolog, analog or derivative of human GDNF that has activity of human GDNF.
19. The method of claim 18 wherein the GDNF is a human GDNF.
20. The method of any one of claims 1, 3, 5, 7, or 10 wherein the nervous system  
10 is the central nervous system.
20. The method of any one of claims 1, 3, 5, 7, or 10 wherein the nervous system is the peripheral nervous system.
21. The method of any one of claims 1-10 wherein the mammal is a primate.
22. The method of claim 21 wherein the primate is a human.
23. The method of any one of claims 1-10 wherein the administering is  
15 intracranially.
24. The method of claim 23 wherein the administering intracranially is to the striatum.
25. The method of claim 23 wherein the administering intracranially is to the  
20 substantia nigra.
26. The method of any one of claims 1-10 wherein the administering is by retrograde transport.
27. The method of any one of claims 1-10 wherein there is growth factor expression for a duration of up to 8 months.
28. The method of any one of claims 5, 6, 7 or 8 wherein the treating of  
25 Parkinson's disease or of symptoms of Parkinson's disease is defined as a reversal of motor deficits.
29. The method of any one of claims 1-8 wherein the method is a method for treating.
30. The method of any one of claims 9-10 wherein the method is a method for  
30 preventing nigrostriatal degeneration and/or inducing nigrostriatal regeneration.